REMARKS/ARGUMENT

Claims 1-69 and 71-74 are pending.

Claims 50-52 are allowed.

Claims 31, 61 and 69 have been amended to overcome the objections set forth by Examiner.

Claims 31 and 64 have been amended better to define the claimed invention and overcome the 35 U.S.C. 112, second paragraph, rejections. Accordingly, the 35 U.S.C. 112, second paragraph, rejections of 31-38 and 64 are overcome.

1)   Claims 1, 2, 10, 13-14, 27-28, 31, 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US Patent No.: 6,392,596) in view of Alexander, Jr. et al. (US Patent No.: 6,259,924). Applicants respectfully traverse this rejection, as set forth below.

In proceedings before the Patent and Trademark Office, "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art". *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (citing *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). "The Examiner can satisfy this burden **only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references**", *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992)(citing *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598

(Fed. Cir. 1988)(citing *In re Lalu*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

Although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.** *In re Gordon*, 733 F.2d at 902, 221 USPQ at 1127. Moreover, **it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.** *In re Gorman*, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). See also *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

Furthermore, "all words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Independent Claim 1 requires and positively recites, a wireless receiver for receiving signals from a transmitter, **the transmitter comprising a plurality of transmit antennas for transmitting the signals which comprise respective streams of independent symbols and wherein interference occurs between the respective streams**, the receiver comprising: "a plurality of receive antennas **for receiving the signals** as influenced by a channel effect **between the receiver and the transmitter**", "circuitry for multiplying the signals with a conjugate transpose **of an estimate of the channel effect** and with a conjugate transpose of **a linear basis** transformation matrix", "**circuitry for selecting the linear basis transformation matrix** from a finite set of linear basis transformation matrices" and "circuitry for removing the interference **between the respective streams**".

Independent Claim 31 requires and positively recites, a wireless communication system, comprising: "**a transmitter comprising <u>a plurality of transmit antennas for transmitting signals</u> which comprise respective streams of independent symbols and wherein <u>interference occurs between the respective streams</u>**" and "a receiver for receiving signals from the transmitter, comprising: "a plurality of receive antennas **<u>for receiving the signals</u>** as **<u>influenced by a channel effect between the receiver and the transmitter</u>**; circuitry for multiplying the signals with a conjugate transpose **of an estimate of the channel effect** and with a conjugate transpose of a **linear basis** transformation matrix; **circuitry for selecting the linear basis transformation matrix** from a finite set of linear basis transformation matrices; and circuitry for removing the interference **between the respective streams**".

Independent Claim 39 requires and positively recites, a method of operating a wireless receiver, comprising: "receiving signals at a plurality of receive antennas and transmitted from a transmitter, **the transmitter comprising <u>a plurality of transmit antennas for transmitting the signals</u> which comprise respective streams of independent symbols and wherein <u>interference occurs between the respective streams</u>** and wherein **<u>the received signals are influenced by a channel effect between the receiver and the transmitter</u>**", "multiplying the signals with a conjugate transpose **of an estimate of the channel effect** and with a conjugate transpose of a **linear basis** transformation matrix", "**selecting the linear basis transformation matrix** from a finite set of linear basis transformation matrices" and "removing the interference **between the respective streams**".

In contrast, Lin et al. discloses single-port weighting systems for applying phase and/or amplitude weights to receive (Abstract, lines 1-2) GPS signals 68 from GPS satellites 70 (i.e., each transmitting on a single transmitting antenna)(col. 4, lines 28-30; Fig. 3). There is no teaching, however, in Lin that any of the GPS satellites 70 use more than one transmit antenna to transmit signals to any device. Moreover, each GPS satellite

has its own transmitter. As such, Lin fails to teach or suggest, "… **transmitter comprising a plurality of transmit antennas for transmitting the signals which comprise respective streams of independent symbols …"**, as required by Claims 1 & 31 OR **"a transmitter comprising a plurality of transmit antennas for transmitting the signals which comprise respective streams of independent symbols …"**, as required by Claim 39.

In addition to the above, Lin's invention is directed to compensating for "undesired interference signals 72 (e.g., from directional jamming sources)(col. 4, lines 28-31) – NOT interference where the interference of concern is that occurring "between the respective streams from the transmitters. As such, Lin fails to teach or suggest, "… transmitter comprising a plurality of transmit antennas for transmitting the signals which comprise respective streams of independent symbols **and wherein interference occurs between the respective streams"**, as required by Claims 1, 31 & 39.

Further, Lin discloses a formula (Col. 7, equation 6) that is used to find a minimum output power Y (Col. 7, lines 14-18). While a conjugate operator * is used in the calculation to arrive at the minimum output power Y, nowhere does equation 6 further teach that output power Y is multiplied with conjugate operation *. Moreover, even if, arguendo, it did, Examiner has not identified the "circuitry" within Lin that performs this function. Accordingly, Lin fails to teach or suggest, "… multiplying the signals with a conjugate transpose **of an estimate of the channel effect** and with a conjugate transpose of a linear basis transformation matrix", as required by Claims 1, 31 & 39.

In addition to the above, Lin discloses (Col. 8, lines 56-58) a number of complete functions (e.g., Harr functions, Bessel functions and Legendre polynomials) that can be selected for a "radical basis" – NOT a "linear basis", as such, Lin fails to teach or

suggest, "… multiplying the signals with a conjugate transpose **of an estimate of the channel effect** and with a conjugate transpose of **a linear basis** transformation matrix", as required by Claims 1, 31 & 39.

Further, Lin teaches the removal of the misalignment or interference caused by external sources (i.e., undesired interferences signals 72 from directional jamming sources)(col. 4, lines 28-31) but NOT interference between signals from separate transmit antennas from the same transmitter. As such, Lin fails to teach or suggest, "… removing the interference **between the respective streams**", as required by Claims 1, 31 & 39.

Examiner admits that Lin fails to teach or suggest "channel estimation" (Office Action, page 4, line 18). Examiner, however, relies upon Alexander, Jr. et al. for such teaching. But even if, arguendo, Alexander discloses, "power monitoring can be performed using channel impulse responses or effect of the channel", Alexander does not teach or suggest ALL of the above-identified deficiencies of Lin as applied to Claims 1 and 31. Accordingly, any combination of Lin and Alexander fails to teach or suggest ALL of the limitations of Claims 1, 31 and 39. As such, the 35 U.S.C. 103(a) rejection of Claims 1, 31 and 39 is improper and must be withdrawn.

Claims 2, 10, 13, 14, 27 and 28 stand allowable as depending directly, or indirectly, from respective allowable Claim 1. Claim 32 stands allowable as depending directly from respective allowable Claim 31. Claim 40 stands allowable as depending directly from respective allowable Claim 39.

Claim 2 further defines the receiver of claim 1 and further comprising circuitry for determining the **estimate** of the channel effect, and wherein the circuitry for selecting selects the linear basis transformation matrix **in response to the estimate of the channel effect**. Claim 2 depends from claim 1 and therefore stands allowable for the same reasons

provided above in support of the allowance of claim 1. In addition to the above, Alexander

teaches actual "measuring" -- NOT estimating -- of radio frequency signal propagation. Lin

discloses "selecting the linear basis transformation matrix in response to the estimate of the

power" (col. 7, lines 45-48) -- NOT in response to the effect of the channel effect and NOT

in response to "actual measurement" of the power. Accordingly, it would not have been

obvious to one having ordinary skill in the art to combine Alexander and Lin in order to

somehow arrive at the invention of Claim 2, without the improper hindsight provided by the

present disclosure. As such, the 35 U.S.C. 103(a) rejection of Claim 2 is improper and must

be withdrawn.

Claim 10 further defines the receiver of claim 1 and further comprising circuitry for

communicating an identification of the linear basis transformation matrix **to the transmitter**

via a feedback channel. Claim 10 depends from claim 1 and therefore stands allowable for

the same reasons provided above in support of the allowance of claim 1. In addition to the

above, Lin discloses that "baseband signals from the downconverters are digitized in a ADC

128 and processed in a DSP 129 which feeds back phase-shifter adjustment signals to the L1

and L2 phase-shifter portions 124 and 125 (col. 5, lines 15-20). But such teaching is for

feeding back phase-shifter adjustment signals within the RECEIVER -- NOT to the

transmitter via a feedback channel. This makes sense since Lin discloses only a GPS

receiver that does not communicate back with the GPS satellites. As such, Lin's receiver

does nothing that affects the functioning of the transmitters of the GPS satellites.

Accordingly, the 35 U.S.C. 103(a) rejection of Claim 10 is improper and must be

withdrawn.

Claim 13 further defines the receiver of claim 1 wherein each matrix in the finite set

of linear basis transformation matrices is **operable for performing a** _rotation by the_

transmitter **of the symbols**. Claim 13 depends from claim 1 and therefore stands allowable

for the same reasons provided above in support of the allowance of claim 1. In addition to

the above, there is no teaching in col. 9 of Lin for "wherein each matrix in the finite set of linear basis transformation matrices is **operable for performing a _rotation by the transmitter_ of the symbols**", as suggested by Examiner. Even if, arguendo, Lin's receiver performs some sort of rotation of the symbols, there is no teaching that such rotation of the symbols is performed by the transmitter. This makes sense since Lin discloses only a GPS receiver that does not communicate back with the GPS satellites. As such, Lin's receiver does nothing that affects the functioning of the transmitters of the GPS satellites. Accordingly, the 35 U.S.C. 103(a) rejection of Claim 13 is improper and must be withdrawn.

Claim 14 further defines the receiver of claim 1 wherein each matrix in the finite set of linear basis transformation matrices is **operable for performing a _rotation and phase change by the transmitter_ of the symbols**. Claim 14 depends from claim 1 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 1. In addition to the above, there is no teaching in col. 9 of Lin for "wherein each matrix in the finite set of linear basis transformation matrices is **operable for performing a _rotation and phase change by the transmitter_ of the symbols**", as suggested by Examiner. Even if, arguendo, Lin's receiver performs some sort of rotation of the symbols, there is no teaching that such rotation of the symbols is performed by the transmitter. This makes sense since Lin discloses only a GPS receiver that does not communicate back with the GPS satellites. As such, Lin's receiver does nothing that affects the functioning of the transmitters of the GPS satellites. Accordingly, the 35 U.S.C. 103(a) rejection of Claim 14 is improper and must be withdrawn.

Claim 27 further defines the receiver of claim 1 wherein **the plurality of transmit antennas and the plurality of receive antennas are a same number of antennas**. Claim 27 depends from claim 1 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 1. In addition to the above, Lin clearly describes

Fig. 2 as being the receiving structure 120 of Fig. 4 (col. 5, lines 14-15). Label 130 references a circular array that has a reference element 132 – all within receiving structure. Thus 130 references receiver antennas only. As such, Lin fails to teach or suggest, "wherein **the plurality of TRANSMIT antennas and the plurality of receive antennas are a same number of antennas**", as required by Claim 27. Accordingly, the 35 U.S.C. 103(a) rejection of Claim 27 is improper and must be withdrawn.

Claim 28 further defines the receiver of claim 27 wherein the same number equals two. Claim 28 depends from claim 27 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 27.

Claim 32 further defines the system of claim 31 wherein the receiver further comprises circuitry for determining the **estimate** of the channel effect, and wherein the circuitry for selecting selects the linear basis transformation matrix **in response to the estimate of the channel effect**. Claim 32 depends from claim 31 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 31. In addition to the above, Alexander teaches actual "measuring" – NOT estimating – of radio frequency signal propagation. Lin discloses "selecting the linear basis transformation matrix in response to the estimate of the power" (col. 7, lines 45-48) – NOT in response to the effect of the channel effect and NOT in response to "actual measurement" of the power. Accordingly, it would not have been obvious to one having ordinary skill in the art to combine Alexander and Lin in order to somehow arrive at the invention of Claim 32, without the improper hindsight provided by the present disclosure. As such, the 35 U.S.C. 103(a) rejection of Claim 32 is improper and must be withdrawn.

Claim 40 further defines the method of claim 39 and further comprising determining the **estimate** of the channel effect, and wherein the step of selecting selects the linear basis transformation matrix **in response to the estimate of the channel effect**. Claim 40 depends

from claim 39 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 39. In addition to the above, Alexander teaches actual "measuring" – NOT estimating – of radio frequency signal propagation. Lin discloses "selecting the linear basis transformation matrix in response to the estimate of the power" (col. 7, lines 45-48) – NOT in response to the effect of the channel effect and NOT in response to "actual measurement" of the power. Accordingly, it would not have been obvious to one having ordinary skill in the art to combine Alexander and Lin in order to somehow arrive at the invention of Claim 40, without the improper hindsight provided by the present disclosure. As such, the 35 U.S.C. 103(a) rejection of Claim 40 is improper and must be withdrawn.

2)   Claim 21 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US Patent No.: 6,392,596) in view of Alexander, Jr. et al. (US Patent No.: 6,259,924), and further in view of Hafeez et al. (US Patent No. 6,920,191). Applicants respectfully traverse this rejection, as set forth below.

In proceedings before the Patent and Trademark Office, "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art". *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (citing *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). "The Examiner can satisfy this burden **only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references**", *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992)(citing *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988)(citing *In re Lalu*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

Although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.** *In re Gordon*, 733 F.2d at 902, 221 USPQ at 1127. Moreover, **it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.** *In re Gorman*, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). See also *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

Furthermore, "all words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Claim 21 further defines the receiver of claim 1 and further comprising circuitry for determining the estimate of the channel effect in response to pilot symbols received from the transmitter.

Independent Claim 1, the claim upon which Claim 21 depends, requires and positively recites, a wireless receiver for receiving signals from a transmitter, **the transmitter comprising a plurality of transmit antennas for transmitting the signals which comprise respective streams of independent symbols and wherein interference occurs between the respective streams**, the receiver comprising: "a plurality of receive antennas **for receiving the signals** as influenced by a channel effect **between the receiver and the transmitter**", "circuitry for multiplying the signals with a conjugate transpose **of an estimate of the channel effect** and with a conjugate transpose of **a linear basis** transformation matrix", "**circuitry for selecting the linear basis transformation matrix**

from a finite set of linear basis transformation matrices" and "circuitry for removing the interference **between the respective streams**".

In contrast, Lin et al. discloses single-port weighting systems for applying phase and/or amplitude weights to receive (Abstract, lines 1-2) GPS signals 68 from GPS satellites 70 (i.e., each transmitting on a single transmitting antenna)(col. 4, lines 28-30; Fig. 3). There is no teaching, however, in Lin that any of the GPS satellites 70 use more than one transmit antenna to transmit signals to any device. Moreover, each GPS satellite has its own transmitter. As such, Lin fails to teach or suggest, "... **transmitter comprising a plurality of transmit antennas for transmitting the signals which comprise respective streams of independent symbols ...**", as required by Claim 1.

In addition to the above, Lin's invention is directed to compensating for "undesired interference signals 72 (e.g., from directional jamming sources)(col. 4, lines 28-31) – NOT interference where the interference of concern is that occurring "between the respective streams from the transmitters. As such, Lin fails to teach or suggest, "... transmitter comprising a plurality of transmit antennas for transmitting the signals which comprise respective streams of independent symbols **and wherein interference occurs between the respective streams**", as required by Claim 1.

Further, Lin discloses a formula (Col. 7, equation 6) that is used to find a minimum output power Y (Col. 7, lines 14-18). While a conjugate operator * is used in the calculation to arrive at the minimum output power Y, nowhere does equation 6 further teach that output power Y is multiplied with conjugate operation *. Moreover, even if, arguendo, it did, Examiner has not identified the "circuitry" within Lin that performs this function. Accordingly, Lin fails to teach or suggest, "... multiplying the signals with a conjugate transpose **of an estimate of the channel effect** and with a conjugate transpose of a linear basis transformation matrix", as required by Claim 1.

In addition to the above, Lin discloses (Col. 8, lines 56-58) a number of complete functions (e.g., Harr functions, Bessel functions and Legendre polynomials) that can be selected for a "radical basis" – NOT a "linear basis", as such, Lin fails to teach or suggest, "… multiplying the signals with a conjugate transpose **of an estimate of the channel effect** and with a conjugate transpose of **a linear basis** transformation matrix", as further required by Claim 1.

Further, Lin teaches the removal of the misalignment or interference caused by external sources (i.e., undesired interferences signals 72 from directional jamming sources)(col. 4, lines 28-31) but NOT interference between signals from separate transmit antennas from the same transmitter. As such, Lin fails to teach or suggest, "… removing the interference **between the respective streams**", as yet further required by Claim 1.

Examiner admits that Lin fails to teach or suggest "channel estimation" (Office Action, page 4, line 18). Examiner, however, relies upon Alexander, Jr. et al. for such teaching. But even if, arguendo, Alexander discloses, "power monitoring can be performed using channel impulse responses or effect of the channel", Alexander does not teach or suggest ALL of the above-identified deficiencies of Lin as applied to Claim 1.

Examiner further admits that the combination of Lin and Alexander fails to teach or suggest, "circuitry for determining the estimate of the channel effect in response to pilot symbols received from the transmitter", as further required by Claim 21 (OA, page 8, lines 15-17. Examiner, however, relies upon Hafeez et al for such teaching (OA, page 8, 18-22). But even if, arguendo, Hafeez discloses, "circuitry for determining the estimate of the channel effect in response to pilot symbols received from the transmitter", Hafeez does not teach or suggest ALL of the above-identified deficiencies of the combination of Lin and Alexander as applied to Claim 1, the claim from which Claim 21 depends. Accordingly, any combination of Lin, Alexander and Hafeez fails to teach or

suggest ALL of the limitations of Claim 21. As such, the 35 U.S.C. 103(a) rejection of Claim 21 is improper and must be withdrawn.

3)   Claims 19, 22-26, 30 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US Patent No.: 6,392,596) in view of Alexander, Jr. et al. (US Patent No.: 6,259,924), and further in view of Heath, Jr. et al. (US Patent No. 6,298,092). Applicants respectfully traverse this rejection, as set forth below.

In proceedings before the Patent and Trademark Office, "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art". *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (citing *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). "The Examiner can satisfy this burden **only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references**", *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992)(citing *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988)(citing *In re Lalu*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

Although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.** *In re Gordon*, 733 F.2d at 902, 221 USPQ at 1127. Moreover, **it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.** *In re Gorman*, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888

(Fed.Cir.1991). See also *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

Furthermore, "all words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Claim 19 further defines the receiver of claim 1 wherein the circuitry for multiplying comprises space time block coded decoding circuitry.

Claim 26 further defines the receiver of claim 1 wherein the circuitry for multiplying the signals times a conjugate transpose of an estimate of the channel effect comprises a space time block coded transmit antenna diversity decoder.

Independent Claim 1, the claim upon which Claim 21 depends, requires and positively recites, a wireless receiver for receiving signals from a transmitter, **the transmitter comprising a plurality of transmit antennas for transmitting the signals which comprise respective streams of independent symbols and wherein interference occurs between the respective streams**, the receiver comprising: "a plurality of receive antennas **for receiving the signals** as influenced by a channel effect **between the receiver and the transmitter**", "circuitry for multiplying the signals with a conjugate transpose **of an estimate of the channel effect** and with a conjugate transpose of **a linear basis** transformation matrix", "**circuitry for selecting the linear basis transformation matrix from a finite set of linear basis transformation matrices**" and "circuitry for removing the interference **between the respective streams**".

In contrast, Lin et al. discloses single-port weighting systems for applying phase and/or amplitude weights to receive (Abstract, lines 1-2) GPS signals 68 from GPS

satellites 70 (i.e., each transmitting on a single transmitting antenna)(col. 4, lines 28-30; Fig. 3). There is no teaching, however, in Lin that any of the GPS satellites 70 use more than one transmit antenna to transmit signals to any device. Moreover, each GPS satellite has its own transmitter. As such, Lin fails to teach or suggest, "... **transmitter comprising <u>a plurality of transmit antennas for transmitting the signals</u> which comprise respective streams of independent symbols ...**", as required by Claims 1 & 31 OR "**<u>a transmitter</u> comprising <u>a plurality of transmit antennas for transmitting the signals</u> which comprise respective streams of independent symbols ...**", as required by Claim 39.

In addition to the above, Lin's invention is directed to compensating for "undesired interference signals 72 (e.g., <u>from directional jamming sources</u>)(col. 4, lines 28-31) – NOT interference where the interference of concern is that occurring "between the respective streams from the transmitters. As such, Lin fails to teach or suggest, "... transmitter comprising <u>a plurality of transmit antennas for transmitting the signals</u> which comprise respective streams of independent symbols **and <u>wherein interference occurs between the respective streams</u>**", as required by Claims 1, 31 & 39.

Further, Lin discloses a formula (Col. 7, equation 6) that is used to find a minimum output power Y (Col. 7, lines 14-18). While a conjugate operator * is used in the calculation to arrive at the minimum output power Y, nowhere does equation 6 further teach that output power Y is multiplied with conjugate operation *. Moreover, even if, arguendo, it did, Examiner has not identified the "circuitry" within Lin that performs this function. Accordingly, Lin fails to teach or suggest, "... multiplying the signals with a conjugate transpose **of an estimate of the channel effect** and with a conjugate transpose of a linear basis transformation matrix", as required by Claim 1.

In addition to the above, Lin discloses (Col. 8, lines 56-58) a number of complete functions (e.g., Harr functions, Bessel functions and Legendre polynomials) that can be selected for a "radical basis" – NOT a "linear basis", as such, Lin fails to teach or suggest, "… multiplying the signals with a conjugate transpose **of an estimate of the channel effect** and with a conjugate transpose of **a linear basis** transformation matrix", as further required by Claim 1.

Further, Lin teaches the removal of the misalignment or interference caused by external sources (i.e., undesired interferences signals 72 from directional jamming sources)(col. 4, lines 28-31) but NOT interference between signals from separate transmit antennas from the same transmitter. As such, Lin fails to teach or suggest, "… removing the interference **between the respective streams**", as yet further required by Claim 1.

Examiner admits that Lin fails to teach or suggest "channel estimation" (Office Action, page 4, line 18). Examiner, however, relies upon Alexander, Jr. et al. for such teaching. But even if, arguendo, Alexander discloses, "power monitoring can be performed using channel impulse responses or effect of the channel", Alexander does not teach or suggest ALL of the above-identified deficiencies of Lin as applied to Claim 1.

Examiner further admits that any combination of Lin and Alexander fails to teach or suggest, "the circuitry for multiplying comprises space time block coded decoding circuitry" (OA, page 9, lines 4-5). Examiner instead relies upon Heath Jr. et al for such teaching (OA, page 9, lines 6-12). But even if, arguendo, Heath teaches what is proposed by Examiner, Heath fails to teach or suggest the previously identified deficiencies of any combination of Lin and Alexander as applied to Claim 1, the claim from which Claims 19 and 26 depend. As such, any combination of Lin, Alexander and Heath fails to teach or suggest all of the limitations of Claims 19 and 26. Accordingly, the 35 U.S.C. 103(a) rejection of Claims 19 and 26 is improper and must be withdrawn.

Claim 22 further defines the receiver of claim 1 wherein the circuitry for removing the interference between the respective streams is selected from a group consisting of circuitry for zero forcing, circuitry for determining a minimum mean square error, and circuitry for determining a maximum likelihood. Examiner admits that any combination of Lin and Alexander fails to teach or suggest, "the circuitry for removing the interference between the respective streams is selected from a group consisting of circuitry for zero forcing, circuitry for determining a minimum mean square error, and circuitry for determining a maximum likelihood" (OA, page 9, lines 14-18). Examiner, however, relies upon Claim 14 of Heath, Jr. as teaching this limitation. Applicants respectfully point out that Claim 14 does not teach one of ordinary skill in the art "how" to implement these limitations. Examiner must point to teaching in the specification and/or drawings to support his determination. But even if, arguendo, there were support in the specification for this teaching, Heath does not teach or suggest the above-identified deficiencies of any combination of Lin and Alexander. As a result, any combination of Lin, Alexander and Heath fails to teach or suggest all of the limitations of Claim 22. Accordingly, the 35 U.S.C. 103(a) rejection of Claim 22 is improper and must be withdrawn.

Claim 23 further defines the receiver of claim 1 wherein the signals comprise CDMA signals and further comprising circuitry for despreading the CDMA signals. Examiner admits that any combination of Lin and Alexander fails to teach or suggest, "the signals comprise CDMA signals and further comprising circuitry for dispreading the CDMA signals". Examiner, however, relies upon Heath Jr. for this teaching (OA, page 10, lines 1-4. Applicants respectfully point out that even if, arguendo, Heath teaches what is proposed by Examiner, Heath does not teach or suggest the above-identified deficiencies of any combination of Lin and Alexander. As a result, any combination of Lin, Alexander and Heath fails to teach or suggest all of the limitations of Claim 23.

Accordingly, the 35 U.S.C. 103(a) rejection of Claim 23 is improper and must be withdrawn.

Claim 24 further defines the receiver of claim 1 wherein the signals comprise TDMA signals. Examiner admits that any combination of Lin and Alexander fails to teach "wherein the signals comprise TDMA signals". Examiner, however, relies upon Heath Jr. for this teaching (OA, page 10, lines 5-6). Applicants respectfully point out that even if, arguendo, Heath teaches what is proposed by Examiner, Heath does not teach or suggest the above-identified deficiencies of any combination of Lin and Alexander. As a result, any combination of Lin, Alexander and Heath fails to teach or suggest all of the limitations of Claim 24. Accordingly, the 35 U.S.C. 103(a) rejection of Claim 24 is improper and must be withdrawn.

Claim 25 further defines the receiver of claim 1 wherein the symbols are selected from a group consisting of quadrature phase shift keying symbols, binary phase shift keying symbols, and quadrature amplitude modulation symbols. Examiner admits that any combination of Lin and Alexander fails to teach "wherein the symbols are selected from a group consisting of quadrature phase shift keying symbols, binary phase shift keying symbols, and quadrature amplitude modulation symbols". Examiner, however, relies upon Heath Jr. for this teaching (OA, page 10, lines 7-10). Applicants respectfully point out that even if, arguendo, Heath teaches what is proposed by Examiner, Heath does not teach or suggest the above-identified deficiencies of any combination of Lin and Alexander. As a result, any combination of Lin, Alexander and Heath fails to teach or suggest all of the limitations of Claim 25. Accordingly, the 35 U.S.C. 103(a) rejection of Claim 25 is improper and must be withdrawn.

Claim 30 further defines the receiver of claim 1 and further comprising: "a demodulator coupled to **receive an output from the circuitry <u>for multiplying</u>**", "a

deinterleaver **coupled to receive an output of the demodulator**" and "a decoder **coupled to receive an output of the deinterleaver**". Examiner admits that any combination of Lin and Alexander fails to teach "a demodulator coupled to **receive an output from the circuitry for multiplying**", "a deinterleaver **coupled to receive an output of the demodulator**" and "a decoder **coupled to receive an output of the deinterleaver**". Examiner, however, relies upon Heath Jr. for the last two of the above three elements (OA, page 10, line 12 – page 11, line 5). But Applicants point out that Fig. 3 does not disclose what is suggested by Examiner. There is no teaching in Fig. 3 for "a deinterleaver **coupled to receive an output of the demodulator**". Similarly, there is no teaching in Fig. 3 for "a decoder **coupled to receive an output of the deinterleaver**". Accordingly, Examiner determination is supposition not supported by fact – little more than improper hindsight reconstruction. But even if, arguendo, Heath were to teach what is proposed by Examiner, Heath does not teach or suggest the above-identified deficiencies of any combination of Lin and Alexander. As a result, any combination of Lin, Alexander and Heath fails to teach or suggest all of the limitations of Claim 30. Accordingly, the 35 U.S.C. 103(a) rejection of Claim 30 is improper and must be withdrawn.

Claim 53 further defines the wireless transmitter of claim 42 and further comprising circuitry for space time block coded encoding the symbols.

Independent Claim 42 (the claim from which Claim 53 depends) requires and positively recites, a **wireless transmitter for transmitting signals to a receiver**, comprising: "a **plurality of transmit antennas** for **transmitting the signals, the signals comprising a plurality of independent streams of data symbols**", "**circuitry for selecting a linear basis transformation matrix** from one of at least two matrices **in response to a communication received by the transmitter from the receiver via a feedback channel**" and "circuitry for multiplying the data symbols with the linear basis

transformation matrix, wherein the signals are responsive to the multiplication with the linear basis transformation matrix".

In contrast, Lin et al. discloses a single-port weighting systems for applying phase and/or amplitude weights to received GPS signals (68) transmitted by separate GPS satellites (70) in a receiver (Abstract, lines 1-2; Fig. 3). Lin does not teach or suggest that the above is a "transmitter". Indeed, it is a GPS receiver. As such, Lin fails to teach or suggest, a **wireless transmitter for transmitting signals to a receiver**, comprising: "a **plurality of transmit antennas** for **transmitting the signals, the signals comprising a plurality of independent streams of data symbols**", as required by Claim 42.

In addition to the above, Lin discloses that "baseband signals from the downconverters are digitized in a ADC 128 and processed in a DSP 129 which feeds back phase-shifter adjustment signals to the L1 and L2 phase-shifter portions 124 and 125 (col. 5, lines 15-20). But such teaching is for feeding back phase-shifter adjustment signals within the RECEIVER – NOT to the transmitter via a feedback channel. This makes sense since Lin discloses only a GPS receiver that does not communicate back with the GPS satellites. As such, Lin's receiver does nothing that affects the functioning of the transmitters of the GPS satellites. Accordingly, Lin fails to teach or suggest, **"circuitry for selecting a linear basis transformation matrix** from one of at least two matrices **in response to a communication received by the transmitter from the receiver via a feedback channel**", as further required by Claim 42.

Examiner admits that Lin fails to teach or suggest "a plurality of transmit antennas" (OA, page 12, line 14). Examiner thereafter proceeds to argue that the transmitter can be composed for multiple or one antenna used for transmission. And thereafter argues that it would have been obvious to one skilled in the art the time of the invention to have one or more antennas of the transmitter based on inventors choice and

he thereafter cites "official notice". Applicants traverse the entire argument above. Indeed, the reason why Lin fails to teach or suggest "a plurality of transmit antennas" is that it teaches only a GPS receiver – there is no transmitter – hence no transmitter or corresponding transmitter antenna(s). Moreover, there is no teaching in Lin that GPS satellites individually transmit toward a receiver using more than one transmit antenna. Thus, Examiner has presented no evidence that one having ordinary skill in the art, viewing Lin, would not have been motivated to create a device with a plurality of transmit antennas.

In addition to the above, Examiner's reliance on "Official Notice" is misplaced and improper. Official notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration as being well-known. As noted by the court in In re Ahlert, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970), the notice of facts beyond the record which may be taken by the examiner must be "capable of such instant and unquestionable demonstration as do defy dispute" (citing In re Knapp Monarch Co., 296 F.2d 230, 132 USPQ 6 (CCPA 1961)). Examiner has provided no evidence from the prior art that supports his determination. Accordingly, Examiner must withdraw his determination or present evidence in the next Office action if the rejection is to be maintained. (See 37 CFR 1.104(c)(2); In re Zurko, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001)). As a result, any combination of Lin and knowledge available to one having ordinary skill in the art at the time of the invention fails to teach or suggest all of the limitations of Claim 53. Accordingly, the 35 U.S.C. 103(a) rejection of Claim 53 is improper and must be withdrawn.

4)   Claim 29 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US Patent No.: 6,392,596) in view of Alexander, Jr. et al. (US Patent No.: 6,259,924). Applicants respectfully traverse this rejection, as set forth below.

In proceedings before the Patent and Trademark Office, "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art". *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (citing *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). "The Examiner can satisfy this burden **only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references**", *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992)(citing *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988)(citing *In re Lalu*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

Although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.** *In re Gordon*, 733 F.2d at 902, 221 USPQ at 1127. Moreover, **it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.** *In re Gorman*, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). See also *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

Furthermore, "all words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Claim 29 further defines the receiver of claim 1 wherein **the plurality of transmit antennas are less in number than the plurality of receive antennas**.

Independent Claim 1 (claim from which Claim 29 depends) requires and positively recites, a wireless receiver for receiving signals from a transmitter, **the transmitter comprising <u>a plurality of transmit antennas for transmitting the signals</u> which comprise respective streams of independent symbols and wherein <u>interference occurs between the respective streams</u>**, the receiver comprising: "a plurality of receive antennas **<u>for receiving the signals</u>** as influenced by a channel effect **<u>between the receiver and the transmitter</u>**", "circuitry for multiplying the signals with a conjugate transpose **of an estimate of the channel effect** and with a conjugate transpose of **a linear basis** transformation matrix", "**circuitry for selecting the linear basis transformation matrix** from a finite set of linear basis transformation matrices" and "circuitry for removing the interference **between the respective streams**".

In contrast, Lin et al. discloses single-port weighting systems for applying phase and/or amplitude weights to receive (Abstract, lines 1-2) GPS signals 68 from GPS satellites 70 (i.e., each transmitting on a single transmitting antenna)(col. 4, lines 28-30; Fig. 3). There is no teaching, however, in Lin that any of the GPS satellites 70 use more than one transmit antenna to transmit signals to any device. Moreover, each GPS satellite has its own transmitter. As such, Lin fails to teach or suggest, "… **transmitter comprising <u>a plurality of transmit antennas for transmitting the signals</u> which comprise respective streams of independent symbols …**", as required by Claim 1.

In addition to the above, Lin's invention is directed to compensating for "undesired interference signals 72 (e.g., <u>from directional jamming sources</u>)(col. 4, lines 28-31) – NOT interference where the interference of concern is that occurring "between the respective streams from the transmitters. As such, Lin fails to teach or suggest, "… <u>transmitter</u> comprising <u>a plurality of transmit antennas for transmitting the signals</u> which comprise respective streams of independent symbols **and <u>wherein interference occurs between the respective streams</u>**", as further required by Claim 1.

Further, Lin discloses a formula (Col. 7, equation 6) that is used to find a minimum output power Y (Col. 7, lines 14-18). While a conjugate operator * is used in the calculation to arrive at the minimum output power Y, nowhere does equation 6 further teach that output power Y is multiplied with conjugate operation *. Moreover, even if, arguendo, it did, Examiner has not identified the "circuitry" within Lin that performs this function. Accordingly, Lin fails to teach or suggest, "... multiplying the signals with a conjugate transpose **of an estimate of the channel effect** and with a conjugate transpose of a linear basis transformation matrix", as yet further required by Claim 1.

In addition to the above, Lin discloses (Col. 8, lines 56-58) a number of complete functions (e.g., Harr functions, Bessel functions and Legendre polynomials) that can be selected for a "radical basis" – NOT a "linear basis", as such, Lin fails to teach or suggest, "... multiplying the signals with a conjugate transpose **of an estimate of the channel effect** and with a conjugate transpose of **a linear basis** transformation matrix", as still yet required by Claim 1.

Further, Lin teaches the removal of the misalignment or interference caused by external sources (i.e., undesired interferences signals 72 from directional jamming sources)(col. 4, lines 28-31) but NOT interference between signals from separate transmit antennas from the same transmitter. As such, Lin fails to teach or suggest, "... removing the interference **between the respective streams**", as required by Claim 1.

Examiner admits that Lin fails to teach or suggest "channel estimation" (Office Action, page 4, line 18). Examiner, however, relies upon Alexander, Jr. et al. for such teaching. But even if, arguendo, Alexander discloses, "power monitoring can be performed using channel impulse responses or effect of the channel", Alexander does not teach or suggest ALL of the above-identified deficiencies of Lin as applied to Claim 1.

Examiner further admits that any combination of Lin and Alexander fails to teach or suggest, "wherein **the plurality of transmit antennas are** <u>**less in number than the plurality of receive antennas**</u>" (OA, page 11, lines 8-13). Examiner, however, argues that it would have been obvious to one skilled in the art to have less number of transmit antennas <u>depending on the inventor's choice and to reduce cost</u>. But Examiner provides no extrinsic evidence that supports his determination – his statement is supposition not supported by fact. Applicants respectfully counter that this is little more than unsupported idle speculation on the part of the Examiner.

Indeed, Examiner's argument seems to be that this additional requirement is "inherent". But, "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.' ... 'Inherency however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient". *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999). "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Int'f 1990). "A prior art reference anticipates a claim only if the reference discloses, either expressly or inherently, every limitation of the claim."; "About the most that can be said for the [prior art] patent is that it does not explicitly describe anything inconsistent with [the claimed] procedures. However, this negative pregnant is no enough to show anticipation." *Rowe v. Dror*, 112 F.3d 473, 478, 480-81, 42 USPQ2d 1550, 1553, 1555 (Fed. Cir. 1997). Summary judgment of inherency anticipation was improper because of a material fact issue whether a prior art reference's process necessarily produced the claimed invention's features; "To serve as an anticipation when the reference is silent about the asserted inherent characteristic, such gap in the reference

may be filled with recourse to extrinsic evidence. Such evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill". *Continental Can Company USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1269, 20 USPQ2d 1746, 1749-50 (Fed. Cir. 1991). Examiner's argument does not meet the above criteria. As a result, Examiner's inherency determination is not supportable. Accordingly, any combination of Lin and Alexander and knowledge available to one having ordinary skill in the art at the time of the invention fails to teach or suggest ALL of the limitations of Claim 29. As such, the 35 U.S.C. 103(a) rejection of Claim 29 is improper and must be withdrawn.

5)   Claims 42-44, 47, 48, 57 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US Patent No.: 6,392,596). Applicants respectfully traverse this rejection, as set forth below.

In proceedings before the Patent and Trademark Office, "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art". *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (citing *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). "The Examiner can satisfy this burden **only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references**", *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992)(citing *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988)(citing *In re Lalu*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

Although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior

art. **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.** *In re Gordon,* 733 F.2d at 902, 221 USPQ at 1127. Moreover, **it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.** *In re Gorman,* 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). See also *Interconnect Planning Corp. v. Feil,* 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

Furthermore, "all words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson,* 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Independent Claim 42 requires and positively recites, a **wireless transmitter for transmitting signals to a receiver,** comprising: "a **plurality of transmit antennas** for **transmitting the signals, the signals comprising a plurality of independent streams of data symbols**", "**circuitry for selecting a linear basis transformation matrix** from one of at least two matrices **in response to a communication received by the transmitter from the receiver via a feedback channel**" and "circuitry for multiplying the data symbols with the linear basis transformation matrix, wherein the signals are responsive to the multiplication with the linear basis transformation matrix".

In contrast, Lin et al. discloses a single-port weighting systems for applying phase and/or amplitude weights to received GPS signals (68) transmitted by separate GPS satellites (70) in a receiver (Abstract, lines 1-2; Fig. 3). Lin does not teach or suggest that the above is a "transmitter". Indeed, it is a GPS receiver. As such, Lin fails to teach or suggest, a **wireless transmitter for transmitting signals to a receiver,** comprising: "a

plurality of transmit antennas for **transmitting the signals, the signals comprising a plurality of independent streams of data symbols**", as required by Claim 42.

In addition to the above, Lin discloses that "baseband signals from the downconverters are digitized in a ADC 128 and processed in a DSP 129 which feeds back phase-shifter adjustment signals to the L1 and L2 phase-shifter portions 124 and 125 (col. 5, lines 15-20). But such teaching is for feeding back phase-shifter adjustment signals within the RECEIVER – NOT to the transmitter via a feedback channel. This makes sense since Lin discloses only a GPS receiver that does not communicate back with the GPS satellites. As such, Lin's receiver does nothing that affects the functioning of the transmitters of the GPS satellites. Accordingly, Lin fails to teach or suggest, **"circuitry for selecting a linear basis transformation matrix** from one of at least two matrices **in response to a communication received by the transmitter from the receiver via a feedback channel**", as further required by Claim 42.

Examiner admits that Lin fails to teach or suggest "a plurality of transmit antennas" (OA, page 12, line 14). Examiner thereafter proceeds to argue that the transmitter can be composed for multiple or one antenna used for transmission. And thereafter argues that it would have been obvious to one skilled in the art the time of the invention to have one or more antennas of the transmitter based on inventors choice and he thereafter cites "official notice". Applicants traverse the entire argument above. Indeed, the reason why Lin fails to teach or suggest "a plurality of transmit antennas" is that it teaches only a GPS receiver – there is no transmitter – hence no transmitter or corresponding transmitter antenna(s). Moreover, there is no teaching in Lin that GPS satellites individually transmit toward a receiver using more than one transmit antenna. Thus, Examiner has presented no evidence that one having ordinary skill in the art, viewing Lin, would not have been motivated to create a device with a plurality of transmit antennas.

In addition to the above, Examiner's reliance on "Official Notice" is misplaced and improper. Official notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration as being well-known. As noted by the court in In re Ahlert, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970), the notice of facts beyond the record which may be taken by the examiner must be "capable of such instant and unquestionable demonstration as do defy dispute" (citing In re Knapp Monarch Co., 296 F.2d 230, 132 USPQ 6 (CCPA 1961)). Examiner has provided no evidence from the prior art that supports his determination. Accordingly, Examiner must withdraw his determination or present evidence in the next Office action if the rejection is to be maintained. (See 37 CFR 1.104(c)(2); In re Zurko, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001)). Accordingly, the 35 U.S.C. 103(a) rejection of Claim 42 is improper and must be withdrawn.

Claims 43, 44, 47, 48, 57 and 58 stand allowable as depending directly, or indirectly, from respective allowable Claim 42.

Claim 43 further defines the wireless transmitter of claim 42 wherein the receiver comprises: "circuitry for selecting the linear basis transformation matrix" and "circuitry for providing the communication to the transmitter via the feedback channel". Claim 43 depends from claim 42 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 42.

Claim 44 further defines the wireless transmitter of claim 43 wherein the circuitry for selecting the linear basis transformation matrix selects from a finite set of linear basis transformation matrices. Claim 44 depends from claim 43 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 43.

Claim 47 further defines the wireless transmitter of claim 42 wherein the linear basis transformation matrix is **operable for performing a <u>rotation by the transmitter</u> of the symbols**. Claim 47 depends from claim 42 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 42. In addition to the above, there is no teaching in col. 9 of Lin for "wherein each matrix in the finite set of linear basis transformation matrices is **operable for performing a <u>rotation by the transmitter</u> of the symbols**", as suggested by Examiner. Even if, arguendo, Lin's receiver performs some sort of rotation of the symbols, there is no teaching that such rotation of the symbols is performed by the transmitter. This makes sense since Lin discloses only a GPS receiver that does not communicate back with the GPS satellites. As such, Lin's receiver does nothing that affects the functioning of the transmitters of the GPS satellites. Accordingly, the 35 U.S.C. 103(a) rejection of Claim 47 is improper and must be withdrawn.

Claim 48 further defines the wireless transmitter of claim 42 wherein the linear basis transformation matrix is **operable for performing a <u>rotation and phase change of the symbols</u>**. Claim 48 depends from claim 42 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 42. In addition to the above, there is no teaching in col. 9 of Lin for "wherein each matrix in the finite set of linear basis transformation matrices is **operable for performing a <u>rotation and phase change of</u> the symbols**", as suggested by Examiner. Even if, arguendo, Lin's receiver performs some sort of rotation of the symbols, there is no teaching that such rotation of the symbols is performed by the transmitter of Claim 47. This makes sense since Lin discloses only a GPS receiver that does not communicate back with the GPS satellites. As such, Lin's receiver does nothing that affects the functioning of the transmitters of the GPS satellites. Accordingly, the 35 U.S.C. 103(a) rejection of Claim 48 is improper and must be withdrawn.

Claim 57 further defines the wireless transmitter of claim 42: "wherein the receiver comprises a plurality of receive antennas". Claim 57 depends from claim 42 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 42.

Claim 58 further defines the wireless transmitter of claim 57 wherein **the plurality of transmit antennas and the plurality of receive antennas are a same number of antennas**. Claim 58 depends from claim 57 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 57. In addition to the above, Lin clearly describes Fig. 2 as being the receiving structure 120 of Fig. 4 (col. 5, lines 14-15). Label 130 references a circular array that has a reference element 132 – all within receiving structure. Thus 130 references receiver antennas only. As such, Lin fails to teach or suggest, "wherein **the plurality of TRANSMIT antennas and the plurality of receive antennas are a same number of antennas**", as required by Claim 58. Accordingly, the 35 U.S.C. 103(a) rejection of Claim 58 is improper and must be withdrawn.

6)   Claims 54-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US Patent No.: 6,392,596) in view of Heath, Jr. et al (US Patent No.: 6,298,092). Applicants respectfully traverse this rejection, as set forth below.

In proceedings before the Patent and Trademark Office, "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art". *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (citing *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). "The Examiner can satisfy this burden **only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to**

combine the relevant teachings of the references", *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992)(citing *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988)(citing *In re Lalu*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

Although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.** *In re Gordon*, 733 F.2d at 902, 221 USPQ at 1127. Moreover, **it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.** *In re Gorman*, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). See also *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

Furthermore, "all words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Claim 54 further defines the wireless transmitter of claim 42 wherein the signals comprise CDMA signals and further comprising circuitry for spreading the CDMA signals.

Claim 55 further defines the wireless transmitter of claim 42 wherein the signals comprise TDMA signals.

Claim 56 further defines the wireless transmitter of claim 42 wherein the symbols are selected from a group consisting of quadrature phase shift keying symbols, binary phase shift keying symbols, and quadrature amplitude modulation symbols.

Independent Claim 42 (the claim from which Claims 54-56 depend) requires and positively recites, a **wireless transmitter for transmitting signals to a receiver**, comprising: "a **plurality of transmit antennas for transmitting the signals, the signals comprising a plurality of independent streams of data symbols**", "**circuitry for selecting a linear basis transformation matrix** from one of at least two matrices **in response to a communication received by the transmitter from the receiver via a feedback channel**" and "circuitry for multiplying the data symbols with the linear basis transformation matrix, wherein the signals are responsive to the multiplication with the linear basis transformation matrix".

In contrast, Lin et al. discloses a single-port weighting systems for applying phase and/or amplitude weights to received GPS signals (68) transmitted by separate GPS satellites (70) in a receiver (Abstract, lines 1-2; Fig. 3). Lin does not teach or suggest that the above is a "transmitter". Indeed, it is a GPS receiver. As such, Lin fails to teach or suggest, a **wireless transmitter for transmitting signals to a receiver**, comprising: "a **plurality of transmit antennas for transmitting the signals, the signals comprising a plurality of independent streams of data symbols**", as required by Claim 42.

In addition to the above, Lin discloses that "baseband signals from the downconverters are digitized in a ADC 128 and processed in a DSP 129 which feeds back phase-shifter adjustment signals to the L1 and L2 phase-shifter portions 124 and 125 (col. 5, lines 15-20). But such teaching is for feeding back phase-shifter adjustment signals within the RECEIVER – NOT to the transmitter via a feedback channel. This makes sense since Lin discloses only a GPS receiver that does not communicate back

with the GPS satellites. As such, Lin's receiver does nothing that affects the functioning of the transmitters of the GPS satellites. Accordingly, Lin fails to teach or suggest, **"circuitry for selecting a linear basis transformation matrix** from one of at least two matrices **in response to a communication received by the transmitter from the receiver via a feedback channel"**, as further required by Claim 42.

Examiner admits that Lin fails to teach or suggest "a plurality of transmit antennas" (OA, page 12, line 14). Examiner thereafter proceeds to argue that the transmitter can be composed for multiple or one antenna used for transmission. And thereafter argues that it would have been obvious to one skilled in the art the time of the invention to have one or more antennas of the transmitter based on inventors choice and he thereafter cites "official notice". Applicants traverse the entire argument above. Indeed, the reason why Lin fails to teach or suggest "a plurality of transmit antennas" is that it teaches only a GPS receiver – there is no transmitter – hence no transmitter or corresponding transmitter antenna(s). Moreover, there is no teaching in Lin that GPS satellites individually transmit toward a receiver using more than one transmit antenna. Thus, Examiner has presented no evidence that one having ordinary skill in the art, viewing Lin, would not have been motivated to create a device with a plurality of transmit antennas.

In addition to the above, Examiner's reliance on "Official Notice" is misplaced and improper. Official notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration as being well-known. As noted by the court in In re Ahlert, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970), the notice of facts beyond the record which may be taken by the examiner must be "capable of such instant and unquestionable demonstration as do defy dispute" (citing In re Knapp Monarch Co., 296 F.2d 230, 132 USPQ 6 (CCPA 1961)). Examiner has provided no

evidence from the prior art that supports his determination. Accordingly, Examiner must withdraw his determination or present evidence in the next Office action if the rejection is to be maintained. (See 37 CFR 1.104(c)(2); In re Zurko, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001)).

In addition to the above, Examiner admits that Lin fails to teach or suggest, "wherein the signals comprise CDMA signals and further comprising circuitry for spreading the CDMA signals", as required by Claim 54, OR "wherein the signals comprise TDMA signals", as required by Claim 55, OR "wherein the symbols are selected from a group consisting of quadrature phase shift keying symbols, binary phase shift keying symbols, and quadrature amplitude modulation symbols", as required by Claim 56. Examiner instead relies upon Heath Jr. as disclosing the above (OA, page 14, lines 1-10). But even if, arguendo, Heath Jr. discloses what is suggested by Examiner, Heath Jr. fails to teach or suggest ALL of the above-identified deficiencies of the Lin reference as applied to Claim 42 (claim from which Claims 54-56 depend). As such, any combination of Lin and Heath Jr. fails to teach or suggest ALL of the limitations of Claims 54-56. Accordingly, the 35 U.S.C. 103(a) rejection is improper and must be withdrawn.

7)   Claim 59 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US Patent No.: 6,392,596) in view of Alexander, Jr. et al (US Patent No.: 6,259,924). Applicants respectfully traverse this rejection, as set forth below.

In proceedings before the Patent and Trademark Office, "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art". _In re Fritch_, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (citing _In re Piasecki_, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). "The Examiner can satisfy this burden **only by showing some objective teaching in the prior art or that knowledge**

generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references", *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992)(citing *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988)(citing *In re Lalu*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

Although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.** *In re Gordon*, 733 F.2d at 902, 221 USPQ at 1127. Moreover, **it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.** *In re Gorman*, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). See also *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

Furthermore, "all words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Claim 59 further defines the wireless transmitter of claim 57 wherein the plurality of transmit antennas are less in number than the plurality of receive antennas. Claim 57 which further defines the wireless transmitter of claim 42 wherein the receiver comprises a plurality of receive antennas.

Independent Claim 42 (the claim from which Claims 57 & 59 depend) requires and positively recites, a **wireless transmitter for transmitting signals to a receiver,**

comprising: "a **plurality of transmit antennas** for **transmitting the signals, the signals comprising a plurality of independent streams of data symbols**", "**circuitry for selecting a linear basis transformation matrix** from one of at least two matrices **in response to a communication received by the transmitter from the receiver via a feedback channel**" and "circuitry for multiplying the data symbols with the linear basis transformation matrix, wherein the signals are responsive to the multiplication with the linear basis transformation matrix".

In contrast, Lin et al. discloses a single-port weighting systems for applying phase and/or amplitude weights to received GPS signals (68) transmitted by separate GPS satellites (70) in a receiver (Abstract, lines 1-2; Fig. 3). Lin does not teach or suggest that the above is a "transmitter". Indeed, it is a GPS receiver. As such, Lin fails to teach or suggest, a **wireless transmitter for transmitting signals to a receiver**, comprising: "a **plurality of transmit antennas** for **transmitting the signals, the signals comprising a plurality of independent streams of data symbols**", as required by Claim 42.

In addition to the above, Lin discloses that "baseband signals from the downconverters are digitized in a ADC 128 and processed in a DSP 129 which feeds back phase-shifter adjustment signals to the L1 and L2 phase-shifter portions 124 and 125 (col. 5, lines 15-20). But such teaching is for feeding back phase-shifter adjustment signals within the RECEIVER – NOT to the transmitter via a feedback channel. This makes sense since Lin discloses only a GPS receiver that does not communicate back with the GPS satellites. As such, Lin's receiver does nothing that affects the functioning of the transmitters of the GPS satellites. Accordingly, Lin fails to teach or suggest, "**circuitry for selecting a linear basis transformation matrix** from one of at least two matrices **in response to a communication received by the transmitter from the receiver via a feedback channel**", as further required by Claim 42.

Examiner admits that Lin fails to teach or suggest "a plurality of transmit antennas" (OA, page 12, line 14). Examiner thereafter proceeds to argue that the transmitter can be composed for multiple or one antenna used for transmission. And thereafter argues that it would have been obvious to one skilled in the art the time of the invention to have one or more antennas of the transmitter based on inventors choice and he thereafter cites "official notice". Applicants traverse the entire argument above. Indeed, the reason why Lin fails to teach or suggest "a plurality of transmit antennas" is that it teaches only a GPS receiver – there is no transmitter – hence no transmitter or corresponding transmitter antenna(s). Moreover, there is no teaching in Lin that GPS satellites individually transmit toward a receiver using more than one transmit antenna. Thus, Examiner has presented no evidence that one having ordinary skill in the art, viewing Lin, would not have been motivated to create a device with a plurality of transmit antennas.

In addition to the above, Examiner's reliance on "Official Notice" is misplaced and improper. Official notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration as being well-known. As noted by the court in In re Ahlert, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970), the notice of facts beyond the record which may be taken by the examiner must be "capable of such instant and unquestionable demonstration as do defy dispute" (citing In re Knapp Monarch Co., 296 F.2d 230, 132 USPQ 6 (CCPA 1961)). Examiner has provided no evidence from the prior art that supports his determination. Accordingly, Examiner must withdraw his determination or present evidence in the next Office action if the rejection is to be maintained. (See 37 CFR 1.104(c)(2); In re Zurko, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001)).

In addition the above, Examiner admits that any combination of Lin and Alexander fails to teach or suggest, "the plurality of transmit antennas are less in number than the plurality of receive antennas". Examiner, however, states "it would have been obvious to one skilled in the art to have less number of transmit antennas depending on the inventor's choice" (OA, page 14, lines 13-18). Applicants respectfully counter that Examiner provides no evidence for his determination. "Inventor's choice" for/of what? Where is the prior art available to one having ordinary skill in the art that addresses the changes/problems that would arise in the "interference occurring between the respective streams" when there are less number of transmit antennas than receive antennas? Examiner's determination is supposition not supported by fact – little more than improper hindsight reconstruction. Moreover, even if, arguendo, there were some validity to Examiner's argument, Examiner does not explain how the above-identified deficiencies of the Lin as applied to Claim 42 would be overcome by a combination of Lin, Alexander and "Inventor's choice". Accordingly, the 35 U.S.C. 103(a) rejection of Claim59 is improper and must be withdrawn.

8)   Claims 60-67 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US Patent No.: 6,392,596) in view of Alexander, Jr. et al. (US Patent No.: 6,259,924), and further in view of Hafeez et al. (US Patent No. 6,920,191). Applicants respectfully traverse this rejection, as set forth below.

In proceedings before the Patent and Trademark Office, "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art". *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (citing *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). "The Examiner can satisfy this burden **only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to**

combine the relevant teachings of the references", *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992)(citing *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988)(citing *In re Lalu*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

Although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.** *In re Gordon*, 733 F.2d at 902, 221 USPQ at 1127. Moreover, **it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.** *In re Gorman*, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). See also *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

Furthermore, "all words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Independent Claim 60 requires and positively recite a method of processing signals in a communication circuit, comprising: "**receiving on a plurality of receive antennas a plurality of signals from a plurality of transmit antennas coupled to a transmitter**", "producing a **channel estimate** in response to a predetermined signal of the plurality of signals", "selecting a matrix from a finite set of matrices in response to one of the channel estimate and an interference cancellation technique" and "multiplying the plurality of signals **by the channel estimate** and the matrix".

In contrast, Lin et al. discloses single-port weighting systems for applying phase and/or amplitude weights to receive (Abstract, lines 1-2) GPS signals 68 from GPS satellites 70 (i.e., each transmitting on a single transmitting antenna)(col. 4, lines 28-30; Fig. 3). There is no teaching, however, in Lin that any of the GPS satellites 70 use more than one transmit antenna to transmit signals to any device. Moreover, each GPS satellite has its own transmitter. As such, Lin fails to teach or suggest, "**receiving on a plurality of receive antennas** a plurality of signals **from a plurality of transmit antennas coupled to a transmitter**", as required by Claim 60.

Further, Lin discloses a formula (Col. 7, equation 6) that is used to find a minimum output power Y (Col. 7, lines 14-18). While a conjugate operator * is used in the calculation to arrive at the minimum output power Y, nowhere does equation 6 further teach that output power Y is multiplied with conjugate operation *. Moreover, even if, arguendo, it did, Examiner has not identified the "circuitry" within Lin that performs this function. Accordingly, Lin fails to teach or suggest, "producing a **channel estimate** in response to a predetermined signal of the plurality of signals", "selecting a matrix from a finite set of matrices in response to one of the channel estimate and an interference cancellation technique" and "multiplying the plurality of signals **by the channel estimate** and the matrix", as required by Claim 60.

Examiner admits that Lin fails to teach or suggest "channel estimate" (Office Action, page 15, lines 15-16). Examiner, however, relies upon Alexander, Jr. et al. for such teaching. But even if, arguendo, Alexander discloses, "power can be determined based on the channel estimate", Alexander does not teach or suggest ALL of the above-identified deficiencies of Lin as applied to Claim 60.

Examiner further admits that Lin further fails to disclose "producing a channel estimate in response to a predetermined signal of the plurality of signals". Examiner,

however, relies upon Hafeez as providing this teaching (OA, page 16, lines 3-7). But even if, arguendo, Hafeez teaches what is suggested by Examiner, Hafeez fails to teach or suggest the above-identified deficiencies of any combination of Lin and Alexander as applied to Claim 60. As such, any combination of Lin, Alexander and Hafeez fails to teach or suggest ALL of the limitations of Claim 60. Accordingly, the 35 U.S.C. 103(a) rejection of Claim 60 is improper and must be withdrawn.

Claims 61-67 stand allowable as depending directly, or indirectly, from respective allowable Claim 60.

Claim 61 further defines the method as in claim 60, further comprising despreading the plurality of signals in response to a code. Claim 61 depends from claim 60 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 60.

Claim 62 further defines the method as in claim 60, further comprising removing interference from the plurality of signals. Claim 62 depends from claim 60 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 60.

Claim 63 further defines the method as in claim 60, further comprising: "identifying the selected matrix to a remote receiver" and "calculating a product of the channel estimate and the selected matrix prior to the step of multiplying". Claim 63 depends from claim 60 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 60.

Claim 64 further defines the method as in claim 60, further comprising: "converting a group of the plurality of signals to a serial signal", "demodulating the serial signal",

"deinterleaving the serial signal" and "decoding the serial signal". Claim 64 depends from claim 60 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 60.

Claim 65 further defines the method as in claim 60, wherein the predetermined signal comprises at least one pilot symbol. Claim 65 depends from claim 60 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 60.

Claim 66 further defines the method as in claim 60, wherein the matrix is a linear basis transformation matrix. Claim 66 depends from claim 60 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 60.

Claim 67 further defines the method as in claim 60, further comprising receiving the plurality of signals from a plurality of remote transmit antennas, wherein the plurality of signals are encoded differently for each respective antenna of the plurality of transmit antennas. Claim 67 depends from claim 60 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 60.

9)   Claims 68, 69 and 71-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US Patent No.: 6,392,596) in view of Heath, Jr. et al (US Patent No.: 6,298,092). Applicants respectfully traverse this rejection, as set forth below.

In proceedings before the Patent and Trademark Office, "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art". *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (citing *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). "The Examiner can satisfy this

burden **only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references**", *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992)(citing *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988)(citing *In re Lalu*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

Although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.** *In re Gordon*, 733 F.2d at 902, 221 USPQ at 1127. Moreover, **it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.** *In re Gorman*, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). See also *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

Furthermore, "all words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Independent Claim 68 requires and positively recites a method of processing signals in a communication circuit, comprising: "receiving a plurality of signals", "**modulating the plurality of signals**", "selecting a matrix from one of at least two matrices in response to a signal from a remote transmitter", "multiplying the modulated signals by the matrix" and "**transmitting the multiplied modulated signals from a plurality of transmit antennas**".

Independent Claim 72 requires and positively recites a method of processing signals in a communication circuit, comprising: "receiving a plurality of signals", "modulating the plurality of signals", "selecting a matrix from a finite set of matrices **in response to a signal from a remote transmitter**", "multiplying the plurality of signals by the matrix" and "**transmitting the plurality of signals from a plurality of transmit antennas, including transmitting a predetermined signal to a remote receiver on a channel different from a channel of the plurality of signals**".

In contrast, Lin et al. discloses a single-port weighting systems for applying phase and/or amplitude weights to received GPS signals (68) transmitted by separate GPS satellites (70) in a receiver (Abstract, lines 1-2; Fig. 3). Lin does not teach or suggest that the above is a "transmitter". Indeed, it is a GPS receiver. As such, Lin fails to teach or suggest, "**transmitting the multiplied modulated signals from a plurality of transmit antennas**", as required by Claim 68, OR "**transmitting the plurality of signals from a plurality of transmit antennas ...**", as required by Claim 72.

Similarly, Examiner seems to be equating "a signal" in the third step of Claim 72, "selecting a matrix from a finite set of matrices **in response to a signal from a remote transmitter**" with the "plurality of signals" in the first step. Examiner has not pointed to any teaching in Lin that discloses a signal separate from the plurality of signals in Lin that is used for "selecting a matrix from a finite set of matrices **in response to a signal from a remote transmitter**", as further required by Claim 72.

In addition to the above Examiner admits that Lin fails to teach or suggest, "...**including transmitting a predetermined signal to a remote receiver on a channel different from a channel of the plurality of signals**", as further required by Claim 72. Examiner however argues this would be obvious to one having ordinary skill in the art "in order to provide information for easy decoding of the data signals". Applicants traverse this

determination which is supposition not supported by fact. Examiner should have no problem citing evidence that supports this determination. Without evidence to support this determination, it should be withdrawn.

In addition to the above, the Examiner admits that Lin fails to teach or suggest, "modulating the plurality of signals" (OA, page 19, line 1). Examiner, however, relies upon Heath Jr. for this limitation. But even if, arguendo, Heath Jr. teaches what is suggested by Examiner, Heath Jr. fails to teach or suggest the above-discussed deficiency of Lin as applied to Claims 68 and 72. As such, any combination of Lin and Heath Jr. fails to teach or suggest ALL of the limitations of Claims 68 and 72. Accordingly, the 35 U.S.C. 103(a) rejection of Claims 68 and 72 is improper and must be withdrawn.

Claims 69, 71, 73 and 74 stand allowable as depending directly, or indirectly, from respective allowable Claim 68.

Claim 69 further defines the method as in claim 68, further comprising spreading the plurality of signals in response to a code. Claim 69 depends from claim 68 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 68.

Claim 71 further defines the method as in claim 68, further comprising: "encoding the plurality of signals", "interleaving the plurality signals" and "converting the plurality of signals to serial signals". Claim 71 depends from claim 68 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 68.
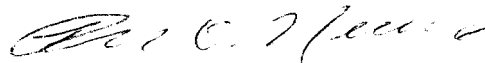
Claim 73 further defines the method as in claim 68, wherein the matrix is a linear basis transformation matrix. Claim 73 depends from claim 68 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 68.

Claim 74 further defines the method as in claim 68, further comprising encoding the plurality of signals, wherein the plurality of signals are encoded differently for each respective antenna of the plurality of transmit antennas. Claim 74 depends from claim 68 and therefore stands allowable for the same reasons provided above in support of the allowance of claim 68.

Applicants appreciate Examiner's determination that Claims 3-9, 11, 12, 15-18, 20, 33-38, 41 and 45-46 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants, however, believe, for the reasons set forth above, that Claims 3-9, 11, 12, 15-18, 20, 33-38, 41 and 45-46 are allowable in their present form.

Claims 50-52 are allowed. Claims 1-49, 53-69 and 71-74 are allowable for all the reasons set forth above. Applicants respectfully request reconsideration and allowance of the application at the earliest possible date.

Respectfully submitted,

Ronald O. Neerings
Reg. No. 34,227
Attorney for Applicants

TEXAS INSTRUMENTS INCORPORATED
P.O. BOX 655474, M/S 3999
Dallas, Texas 75265
Phone: 972/917-5299
Fax: 972/917-4418